Teaching Mathematics for Mastery at Priors Hall – a learning community

'Ready for Learning, Ready for Life'

Curiosity

Kindness

Resilience

Respect

Teaching Mathematics for Mastery at Priors Hall alc

What do we mean by mastery?

The essential idea behind mastery is that ***all children*** need a ***deep*** understanding of the mathematics they are learning so that:

- Future mathematical learning is built on solid foundations which do not need to be re-taught.
- There is no need for separate catch-up programmes due to some children falling behind
- Children, who, under other teaching approaches, can often fall a long way behind, are better able to keep up with their peers, so that gaps in attainment are narrowed whilst the attainment of **all** is raised.
- Children who grasp key concepts rapidly are challenged to deepen their mathematical understanding.

There are generally four ways in which the term mastery is used in regards to raising standards in mathematics:

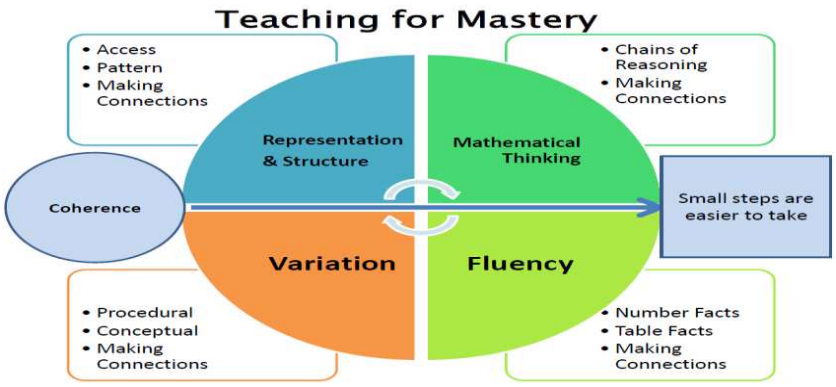
1. **A mastery approach**: a set of principles and beliefs. This includes a belief that all pupils are capable of understanding and doing mathematics, given sufficient time. Pupils are neither 'born with the maths gene' nor 'just no good at maths'. With good teaching, appropriate resources, effort and a 'can do' attitude all children can achieve and enjoy mathematics.

2. **A mastery curriculum**: one set of mathematical concepts and big ideas for all. All pupils need access to these concepts and ideas and to the rich connections between them. There is no such thing as 'special needs mathematics' or 'gifted and talented mathematics'. Mathematics is mathematics and the key ideas and building blocks are important for everyone.

3. **Teaching for mastery**: a set of pedagogic practices that keep the class working together on the same topic, whilst at the same time addressing the need for all pupils to master the curriculum and for some to gain greater depth of proficiency and understanding. Challenge is provided by 'digging deeper' rather than accelerating into new mathematical content. Teaching is focused, rigorous and thorough, to ensure that learning is sufficiently embedded and sustainable over time. Long term gaps in learning are prevented through speedy teacher intervention. More time is spent on teaching topics to allow for the development of depth and sufficient practice to embed learning. Carefully crafted lesson design provides a scaffolded, conceptual journey through the mathematics, engaging pupils in reasoning and the development of mathematical thinking.

4. **Achieving mastery of particular topics and areas of mathematics**. Mastery is not just being able to memorise key facts and procedures and answer test questions accurately and quickly. It involves knowing 'why' as well as knowing 'that' and knowing 'how'. It means being able to use one's knowledge appropriately, flexibly and creatively and to apply it in new and unfamiliar situations.

What is teaching for mastery?



Since mastery is what we want pupils to acquire (or go on acquiring), rather than teachers to demonstrate, we use the phrase ‘teaching for mastery’ to describe the range of elements of classroom practice and school organisation that combine to give pupils the best chances of mastering mathematics.

Mastering maths means acquiring a deep, long-term, secure and adaptable understanding of the subject. At any one point in a pupil’s journey through school, achieving mastery is taken to mean acquiring a solid enough understanding of the maths that’s been taught to enable him/her move on to more advanced material.

Our approach is based on key principles:

Problem solving

Mathematical problem-solving is at the heart of our approach. Pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas. This builds the skills needed to tackle new problems, rather than simply repeating routines without grasping the principles.

High expectations

We believe no child should be left behind. We focus on pupils ‘keeping up over catching up’. By making high expectations clear – and emphasising the high value of mathematics education – learners are encouraged to build confidence and resilience.

Concrete, pictorial, abstract

Objects, pictures, words, numbers and symbols are everywhere. Our approach incorporates all of these to help pupils explore and demonstrate mathematical ideas, enrich their learning experience and deepen understanding. Together, these elements help cement knowledge so pupils truly understand what they’ve learnt.

Depth before breadth

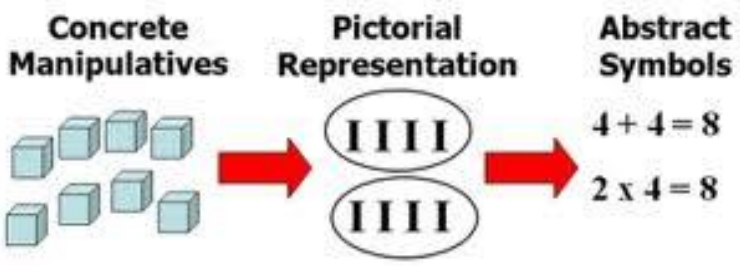
All learners benefit from deepening their conceptual understanding of mathematics, regardless of whether they've previously struggled or excelled. We believe pupils must be given time to fully understand, explore and apply ideas - rather than accelerate through new topics. This approach enables learners to truly grasp a concept, and the challenge comes from investigating it in new, alternative and more complex ways.

Growth mindset

We believe our ‘abilities’ are neither fixed nor innate, but can be developed through practice, support, dedication and hard work. ‘Natural talent’ is just a starting point and does not determine who has more or less potential to achieve. This belief encourages a love of learning and resilience that enables everyone to achieve.

Mathematical language

The way pupils speak and write about mathematics transforms their learning. We use a carefully sequenced, structured approach to introduce and reinforce mathematical vocabulary. We always ask pupils to explain the mathematics in full sentences (not just what the answer is, but how they know it’s the right answer). This is key to building mathematical language and reasoning skills.



What will I see in mathematics lessons at Priors Hall alc?

At Priors Hall alc, we teach mathematics for mastery. Our approach enhances mathematical understanding, enjoyment and achievement for every child.

Children are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols.

Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience.

Maths working walls are divided into four to show the current stem sentences, vocabulary, representations and key facts.

Whole class together – in Years 2 to 6 we teach mathematics to whole classes and do not label children. Lessons are planned based on formative assessment of what pupils already know and we include all children in learning mathematical concepts. At the planning stage, teachers consider the scaffolding that may be required for children struggling to grasp concepts in the lesson and suitable challenge questions for those who may grasp the concepts rapidly.

Continuous Provision – Foundation Stage teach maths through direct teaching and continuous provision. Year 1 continue this practice at the start of the year and build up to longer, whole class lessons.

Key learning points are identified during planning and a clear journey through the maths developed.

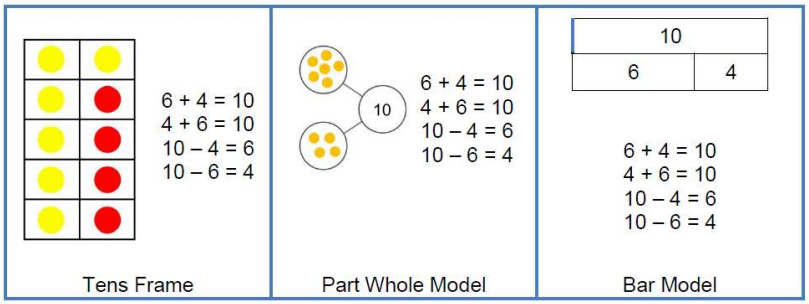
Questions will probe pupil understanding throughout and responses are expected in full sentences, using precise mathematical vocabulary.

Fluency – there is a whole school focus on developing an instant recall of key facts, such as number bonds and times tables. Years 2 - 6 have daily arithmetic sessions in addition to the 5 (1 hour) timetabled maths lessons. Year 1 introduce arithmetic practice during the year. Flashback 4 or Fluent in five are used to revisit previous learning in Years 1 – 6.

Times Tables – TTRS and Numbots is used across the school. Class teachers monitor their own class, and display results in their classroom. Monthly assemblies recognise the achievements of individuals, both by levels of success and progress. Each term, children in all year groups 3-6, complete a times tables test. In Year 4, this is in the format of the statutory multiplication test. All other year groups complete a blank times table grid with the times tables they are required to learn. Year 1 are assessed on their ability to count in steps of twos, fives and tens. Year 2 are assessed on counting in steps of twos, threes, fives from 0, and in tens from any number, forward or backward.

Move between the concrete and the abstract
Children's conceptual understanding and fluency is strengthened if they experience concrete, visual and abstract representations of a concept during a lesson. Moving between the concrete and the abstract helps children to connect abstract symbols with familiar contexts, thus providing the opportunity to make sense of, and develop fluency in the use of, abstract symbols.

For example, in a lesson about number bonds, children could be asked to draw a picture to represent the sum, create physical patterns through the use of various manipulative resources, or in a subsequent lesson, they could be asked to discuss the similarities and differences of three visual representations of the same question:

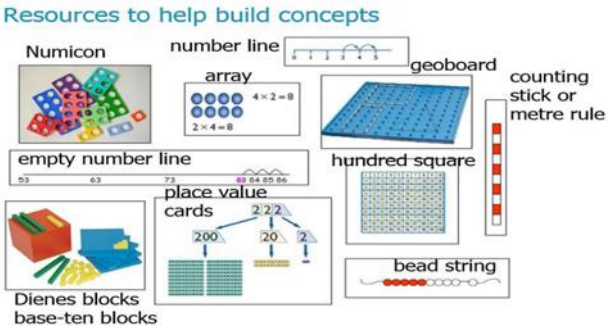


Lesson Structure

Feedback Slides – at the start of each lesson good examples of learning are shared with the class, and misconceptions or errors from previous learning are looked at again. All children are encouraged to dig deeper, verbally, or in their books.

Exploration – children are encouraged to explore a problem themselves to see what they already know.

Develop **reasoning and deep understanding** (contexts and representations of mathematics) – problems are often set in real life contexts – carefully chosen practical resources and pictorial representations are used to explore concepts. These pictorial representations will appear in books as children show their understanding, rather than answers to a series of calculations. The use of practical resources, pictorial representations and recording takes place in every lesson (the CPA approach).



Structuring – the teacher will organise the findings of the exploration, compare/contrast strategies and guide toward the most efficient strategy (or the one being learnt that day).

Step by step approach – journey through the mathematics through small carefully crafted steps to support deep understanding.

Questions to challenge thinking – teachers use questioning throughout every lesson to check understanding – a variety of questions are used, but you will hear the same ones being repeated: How do you know? Can you prove it? Are you sure? Can you represent it another way? What's the value? What's the same/different about? Can you explain that? What does your partner think? Can you imagine?

Discussion and feedback – pupils have opportunities to talk to their partners and explain/clarify their thinking. There will be more talking and work on whiteboards prior to recording in books. We do not want children to attempt independent recording until we believe they are secure with the concept. Feedback will be given to children regularly and time set aside for them to respond.

Presentation – children in Years 1 – 6 use books with squared paper and record the date and title of each lesson. Children write in pencil, with no rubbing out, and edit their learning in purple pen. Worksheets stuck in are cut to fit and glued in neatly.

Marking in books It is important for teachers to distinguish between a pupil's simple slip and an error that reflects a lack of understanding: For slips, it is often enough to simply indicate where each slip occurs and encourage pupils to correct them. At Priors Hall alc, these will be indicated with a pink pen. If errors demonstrate lack of understanding, the teacher may decide to take alternative courses of action. For instance, with a small number of pupils, the teacher may arrange same-day intervention while for a large number of pupils, the errors will be addressed in the next lesson. Correct answers can simply be marked with green pen.

Intervention new learning is built upon previous understanding, so in order for learning to progress and to keep the class together pupils need to be supported to keep up and areas of difficulty must be dealt with as and when they occur. We do this through supporting children as soon as we see the need for additional intervention. In addition, we still run intervention sessions outside of the maths lesson for some targeted children. White Rose maths videos are valuable resources for pre teach or to reinforce a concept taught that day.

SEN pupils – may be supported by additional adults, different resources, differentiated activities. They may also complete additional activities outside of the mathematics lesson. We do not label our children. We have high expectations of all children and strongly believe that all children are equally able in mathematics. Some may take longer to grasp concepts and may need careful scaffolding or extra time/support (guided groups, same day catch-up, additional homework, pre-teaching, intervention group, specific parent support).

Assessment – teachers assess against the National Curriculum objectives using Otrack. End of unit assessment from White Rose Maths are also available. Summative assessment are carried out 4 times a year to support data drops, target setting and pupil progress meetings. Years 2 and 6 complete past SATs papers throughout the year.

Knowledge Organisers – support each unit of maths from White Rose Maths for Years 1 to 6. They can be used in the classroom and shared with parents online to support their child's learning.

Key Documents (all stored on shared drive)

Priors Hall alc Calculation Policy

Priors Hall alc Essential Number Skills

Priors Hall alc Progression of maths vocabulary

Knowledge Organisers – Years 1 to 6